



International Civil Aviation Organization

MIDANPIRG Air Traffic Management Sub-Group

Seventh Meeting (ATM SG/7)
(Virtual, 15 – 18 November 2021)

Agenda Item 3: Planning and Implementation issues related to ATM/SAR

AUTOMATIC DEPENDENT SURVEILLANCE - BROADCAST (ADS-B)

(Presented by Saudi Arabia)

SUMMARY

This paper provides information on Automatic Dependent Surveillance-Broadcast (ADS-B) Out equipage mandate in the kingdom of Saudi Arabia with an overview on the planning for the implementation of ADS-B ground surveillance system that will be used to enhance and expand Air Traffic Control (ATC) surveillance services within Jeddah FIR.

Action by the meeting is in paragraph 6.

REFERENCE(S)

- DOC 4444, PANS-ATM
- DOC 9750, Global Air Navigation Plan
- ICAO MID ANP, Volume III Part II- Table ASUR 3-1
- MID REGION SURVEILLANCE PLAN (MID DOC 013)
- MIDANPIRG/18- RASG-MID/8-Report Appendix 5.2T

1. INTRODUCTION

1.1 The Automatic Dependent Surveillance-Broadcast (ADS-B) is an advanced surveillance technology that combines an aircraft's positioning source, aircraft avionics, and a ground infrastructure to create an accurate surveillance interface between aircraft and air traffic control (ATC). Use of ADS-B Out will gradually move ATC from a radar-based system to an aircraft location system based on satellite-derived position and speed. Aircraft equipped with ADS-B Out equipment are able to continually broadcast information, such as identification, current position, altitude, and speed, through an onboard transmitter, which can be received by ADS-B ground stations and by other aircraft appropriately equipped.

1.2 ADS-B has been identified as an essential Radar-like component in enhancing global safety in ATS and achieving efficiency objectives that bring tangible operational benefits to aviation stakeholders. The ADS-B avionics is recognized as an enabler of the global ATM concept bringing cost-effective substantial safety & capacity benefits.

1.3 The ADS-B Out implementation in the Kingdom of Saudi Arabia (KSA) is aiming at providing redundancy where Radar surveillance is already available. In addition, ADS-B Out will enable the expansion of Air Traffic Control (ATC) surveillance services in remote areas (Empty quarter), and also to fill the surveillance gap within Jeddah FIR. The Automatic Dependent Surveillance

Broadcast “(ADS-B) OUT” transmissions on 1090MHz Extended Squitter data link will be used for the provision of ATS surveillance services to eligible aircraft within specific areas/portions of KSA airspace.

2. ADSB-OUT MANDATE IN KSA

2.1 In March 2016, GACA issued GACAR Part 91 – General Operating and flight rules prescribing equipage requirements and performance standards for ADS-B Out equipment on aircraft operating in Class A and B airspace after 1st January 2020.

2.2 However, based on an assessment of the level of readiness of ADS-B ground infrastructure and ADS-B out aircraft equipage, it was decided to postpone the mandate for the carriage of ADS-B out equipment until 1st January 2023 to allow the aircraft owners, operators and Saudi Air Navigation Services provider (SANS) to have additional time and be ready for ADS-B operation by the applicability date. With this respect, the NOTAM ref: OEJD A1871/19 was issued on 31st December 2019 to inform all operators and KSA airspace users about this decision.

2.3 As consequence, GACAR Part 91 ADS-B Out equipage requirements were amended to set the new effective date of ADS-B Out equipage mandate in KSA airspace to 1st January 2023 and expand the applicability mandate to airspace Classes C, D and E. Therefore, all aircraft intending to operate in Classes A,B,C,D, or E airspace must be equipped with a serviceable 1090 MHz ES ADS-B Out equipment by 1st January 2023. The amendment of GACAR Part 91 can be reached through the following link: <https://gaca.gov.sa/web/en-gb/page/new-regulations>.

3. ADS-B AVIONICS EQUIPAGE CERTIFICATION AND OPERATIONAL APPROVAL

3.1 The amendments of GACAR Part 91 § 91.135 (d), § 91.239 (b) and § 91.477 prescribe the ADS-B Out equipage and use requirements. These requirements state that Saudi Arabian registered Aircraft and foreign Civil Aircraft must be equipped with a serviceable 1090 MHz ES ADS-B equipment that has been certified in accordance with EASA CS-ACNS.D.ADSB, or FAA AC 20-165A – Airworthiness Approval of ADS-B. The amendment of GACAR Part 91 § 91.303 identifies airspace classes A, B, C, D and E where ADS-B Out equipage is mandatory for civil flights.

3.2 The Appendix C Section VII. to GACAR Part 91 prescribes the ADS-B Out equipment performance and installation requirements with the list of data items that must be broadcasted by ADS-B Out equipment. The data items include aircraft’s identification, position, velocity and other information.

3.3 The ADS-B capabilities should be filled in item 10 as part of the description of aircraft equipment and capabilities related to communication, navigation and surveillance in accordance with ICAO Doc 4444- Appendix 2.

4. OVERVIEW OF ADS-B OUT IMPLEMENTATION WITHIN JEDDAH FIR

4.1 Under the implementation of ADS-B, Saudi Air Navigation Services adopted a comprehensive implementation plan to install and use an ADS-B Ground surveillance system during the last quarter of 2020. This plan was impacted by restrictions imposed by COVID-19 pandemic and was reviewed with a tentative planning to complete all deployment activities by the last quarter of 2022.

4.2 The ADS-B Ground surveillance system will mainly include:

- a) Thirteen ADS-B Out 1090ES Ground stations distributed to provide redundancy where Radar surveillance is already available, to fill gaps in radar network coverage and to expand Air Traffic Control (ATC) surveillance services within Jeddah FIR. The

primary function of the ADS-B Ground Station is to receive 1090 MHz RF input on the Air Interface, extract data from the 1090 MHz ES messages, assemble the data as ADS-B Reports and send these reports over the Ground Interface and IP-based network; and

- b) Surveillance Data Processing and Distribution (SDPD) which is multi-sensor tracking system. This system processes surveillance reports originating from different surveillance sources (radar and ADS-B Ground Stations) and fuses the associated reports into a unique system track. The system tracks are assembled into Messages and these messages are sent over the Ground Interface to be displayed and presented on the Situation Data Display (SDD) at Air Traffic Controller positions.

5. DISCUSSION

5.1 As ADS-B Out is providing air traffic controllers with real-time position information that is more accurate than the information available with current radar-based systems. With more accurate information, ATC will be able to position and separate aircraft with improved accuracy and timing. Therefore, ADS-B Out equipage requirements and performance standards can support the improvements in air traffic management in MID region.

5.2 The surveillance provided by ADS-B Out will enhance ATC's ability to manage and separate aircraft so that efficiency and capacity will increase beyond current levels to meet the traffic growth while continually maintaining safety. To obtain the efficiency and capacity benefits that can be realized with ADS-B Out, there is a need that, at least all commercial fleet is equipped ADS-B Out.

5.3 At regional level, MIDANPIRG/17 agreed to monitor the surveillance capabilities in the MID Region through adding Surveillance Monitoring Matrix to the MID ANP Vol III, Part II and to add ADS-B Mandate column to the matrix (effective date and reference regulation - MID ANP Vol III, Part II, Table ASUR 3-1, Surveillance Implementation Monitoring Table refers).

5.4 Therefore, an agreement on a regional mandate for ADS-B out equipage will support the enhancement of surveillance capabilities in MID region and expedite the introduction of regional ATM improvements with increase of efficiency and capacity.

6. ACTION BY THE MEETING

6.1 The meeting is invited to:

- a) note the information provided in this paper;
- b) share information on the level of ADS-B equipage of fleet registered by MID States;
- c) discuss and propose a regional mandate for ADS-B out equipage;
- d) discuss the possibility to develop regional guidance on use of ADS-B for Air Traffic Services; and
- e) discuss the possibility to monitor the level of ADS-B equipage of the registered fleet through MIDRMA.